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[54] Title of invention: A composite material and a method of manufacturing same

[57] Abstract

The present invention provides a composite material with realistic and diverse patterns and pictures. It further provides a method of manufacturing this composite material. The composite material is made basically by casting resin, filler, initiator, and curing agent. It is characterized by the fact that non-woven fabric on which pictures have been printed is preembedded on the surface of the matrix. The method of manufacture is as follows: First, spray or brush a protective coating onto the mold. After the protective coating gels, lay non-woven fabric on which pictures and patterns have been printed. Eliminate bubbles. Then use a resin whose molecular structure is similar to that of the non-woven fabric as the matrix polymer. Take (measured by weight): resin 5-40 parts, filler 60-95 parts, initiator 0.05-5 parts, and curing agent 0.05-8 parts. Mix thoroughly and then cast. Remove bubbles by means of vibrations or vacuum. After it cures, demold, shave off fins, and polish to complete.

CLAIMS

1. A composite material, basically cast from resin, filler, initiator and curing agent, characterized by the fact that non-woven fabric on which is printed pictures is pre-embedded on the matrix surface.

2. A method of manufacturing the composite material described in claim 1: first spray or brush a protective coat on the mold; after the protective coat gels, lay non-woven fabric on which pictures and patterns have been printed, eliminate bubbles, then use a resin whose molecular structure is similar to that of the non-woven fabric to serve as a matrix polymer; take 5 to 40 parts resin, 60 to 95 parts filler, 0.05 to 5 parts initiator, 0.05 parts to 8 parts curing agent (calculated according to weight), mix thoroughly, and cast; eliminate bubbles by means of vibrations or vacuum; demold after curing, shave off fins, and polish to complete.

3. The method as described in claim 2, characterized by the fact that the protective coat can be polyacrylate, polyester, polyamide, polyimide resin; prior to application, add curing agent and initiator to the resin at a 1 : 0.01 to 0.15 ratio, calculated in terms of weight; 0.3 to 0.8 mm is the preferred thickness of the protective coating.

4. The method as described in claim 2: Clean the mold, seal holes, and wax; given that the mold of the present embodiment is 1.0 x 1.0 meters, take 0.53 kg unsaturated polyester gel coat and separately add 10 g initiator and 16 g curing agent, blend thoroughly; spray or manually brush two even coats on the mold; once it cures, spray or brush unsaturated polyester marble resin on the gel coat layer in accordance with the directions, and evenly lay polyester non-woven fabric on which pictures have been printed; use a bubble eliminator to eliminate bubbles; then inject the matrix; take 20 parts unsaturated polyester marble resin, 0.2 part initiator, 0.25 part curing agent, 80 parts marble powder filler, and mix thoroughly; cast in the mold to the required thickness; use vibrations to eliminate bubbles from the casting matrix; after it cures, demold, shave off the fins, carry out after-treatment to obtain composite floor tiles with realistic patterns.

DESCRIPTION

A Composite Material and Method of Manufacturing Same

The present invention is a type of artificial chemical stone. Specifically, it relates to a composite material and a method of making same.

The patterns and pictures on decorative materials are now made by dispersing dyes in parts of a matrix. One approach is to disperse powder dye in parts of matrix resin. Another is to disperse powder dye and liquid dye in a small amount of matrix resin and then to disperse that in parts of a matrix. The patterns and pictures formed this way are highly random and are highly subject to such factors as the environment, materials, and operator skill. Using this approach, it is hard to form pattern effects that are realistic and conform to the aesthetics of different groups. This makes it difficult to promote and apply the artificial, synthesized decorative materials that are made this way.

There is a type of composite material on the market that uses resin as a matrix material. The material is strengthened with fabric and 3-dimensional structures made from card. There are colors, pictures, etc. on the strengthening material that is under the surface resin curing layer. It has the following drawbacks: It is difficult to print or draw pictures on fiberglass fabric, and cloth and 3-dimensional card structures are incompatible with organic resins. Moreover, resin is highly resistant to impregnation. In products made using this method, the picture layer and the strengthening layer quickly whiten, blister, and separate. Matrix layers which are primarily glass fabric are pasted together by hand. It involves folding many layers and coating them with rubber. The process is complex, and the quality is limited by the skill of the operator. Fiberglass-strengthened GFRP tends to deform and shrink and generally cannot meet the smoothness requirements of decorative materials.

The object of the present invention is to overcome the above-described technical shortcomings and to provide a composite material with realistic and varied patterns and pictures. It is also to provide a method of manufacturing this composite material.

A composite material, basically cast from resin, filler, initiator and curing agent, is characterized by the fact that non-woven fabric on which are printed pictures is pre-embedded on the matrix surface.

In order to pre-embed non-woven fabric on a matrix surface, the present invention provides the following method: first spray or brush a protective coat on the mold. After the protective coat gels, lay non-woven fabric on which pictures and patterns have been printed, eliminate bubbles, and then use a resin whose molecular structure is similar to the non-woven fabric to serve as a matrix polymer. Take 5 to 40 parts resin, 60 to 95 parts filler, 0.05 to 5 parts initiator, 0.05 parts to 8 parts curing agent (calculated according to weight), mix thoroughly, and cast. Eliminate bubbles by means of vibrations or vacuum. Demold after curing, shave off fins, and polish to complete.

Since the required pictures are first printed on the non-woven fabric and pre-embedded on the surface of the matrix, the product has realistically-delineated pictures and many shapes and patterns. And because the matrix polymer in the manufacturing method is a resin with a molecular structure similar to that of the non-woven fabric, the matrix is able to meld with the non-woven fabric and finally cure. The result is decorative material products with a realistic picture effect.

A detailed description follows.

Carry out a surface treatment on a mold for decorative material products. This mold can be a metal mold, a wood mold, flat plate

glass, a glass fiber reinforced plastic (GFRP) mold, or a plaster mold. Apply a color product protective coat to the surface of the mold to increase product luster and hardness. This protective coat can be polyacrylate, polyester, polyamide, polyimide resin. Prior to application, add curing agent and initiator to the resin at a 1 : 0.01 to 0.15 ratio, calculated in terms of weight; 0.3 to 0.8 mm is the preferred thickness of the protective coating. After it is completely cured, apply another coat of resin that is the same as the casting polymer and to which no filler has been added. Then uniformly lay thereon the non-woven fabric on which pictures and patterns have been printed. Eliminate bubbles. Then cast the matrix; mix 5 to 40 parts resin, 60 to 95 parts filler, 0.05 to 5 parts initiator, 0.05 to 8 parts curing agent. Cast to the required thickness of the decorative material. The filler can be marble powder, agate powder, granite powder, cenospheres, etc. The selection of this heavy polymer for matrix casting should be based on the nature of the printed product base material. To adhere to the principle of "similar and compatible," the structure of its molecular chain links should be similar to, or the same as, the base material of the printed product, thus enabling the cast heavy polymer matrix to meld, as it cures, with the printed product base material and finally to reaction-cure, without affecting the printed picture or pattern. In this way, decorative material products with realistic picture effects are achieved. After the cast matrix polymer is completely cured, the product can be stripped from the mold and the fins shaved off. When necessary, carry out surface treatment. Thus, it is possible to produce decorative materials with various kinds of patterns and pictures.

Embodiment

In a 1.0 x 1.0 meter GFRP mold, make a faux marble tile with Norway Red veins. Print the Norway Red patterns on resin non-woven fabric. Cut out the printed pattern according to the mold dimensions and set aside.

Clean the mold, seal holes, and treat with wax. Given the fact that the mold of the present embodiment is 1.0 x 1.0 meters, take 0.53 kg unsaturated polyester gel coat and separately add 10 g initiator and 16 g curing agent. Blend thoroughly. Spray or manually brush two even coats on the mold. Once it cures, spray or brush unsaturated polyester marble resin on the gel coat layer in accordance with the directions, and evenly lay polyester non-woven fabric on which pictures have been printed. Use a bubble eliminator to eliminate bubbles. Then inject the matrix. Take (calculated according to weight) 20 parts unsaturated polyester marble resin, 0.2 part initiator, 0.25 part curing agent, 80 parts marble powder filler, and mix thoroughly. Cast in the mold to the required thickness; use vibrations to eliminate bubbles from the casting matrix. After it cures, demold and shave off the fins. Carry out after-treatment to obtain composite floor tiles with realistic patterns.

This composite material has wide-ranging applications in the manufacture of furniture, cleaning implements, and building materials. It will be very easy to promote.

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权利要求书 1 页 说明书 2 页 附图页数 0 页

[54] 发明名称 一种复合材料及其制造方法

[57] 摘要

本发明提供一种花纹图案逼真、多种式样的复合材料，同时还提供制造这种复合材料的方法。复合材料，基体由树脂、填料、引发剂和固化剂浇铸而成，其特征在于采用印刷有图案的无纺布预埋在基体的表面。制造方法如下：先在模具上喷涂或涂刷保护层，保护层凝胶后，铺上印有图案花纹的无纺布，排出气泡，再用与无纺布分子结构相似的树脂作基体聚合物，以重量计算，取树脂 5—40 份、填料 60—95 份、引发剂 0.05—5 份、固化剂 0.05—8 份，并搅匀后浇铸，振动或真空排泡，固化后脱模，修整毛边，抛光处理即成。

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权 利 要 求 书

1、一种复合材料，基体由树脂、填料、引发剂和固化剂浇铸而成，其特征在于采用印刷有图案的无纺布预埋在基体的表面。

2、一种制造如权利要求1所述的复合材料的方法：先在模具上喷涂或涂刷保护层，保护层凝胶后，铺上印有图案花纹的无纺布，排出气泡，再用与无纺布分子结构相似的树脂作基体聚合物，以重量计算，取树脂5—40份、填料60—95份、引发剂0.05—5份、固化剂0.05—8份，并搅匀后浇铸，振动或真空排泡，固化后脱模，修整毛边，抛光处理即成。

3、如权利要求2所述的方法，其特征在于保护层可以用聚丙烯酸酯类树脂、聚酯树脂，聚酰胺、聚酰亚胺类树脂，树脂涂刷前以重量计算，按1:0.01—0.15比例分别加入固化剂、引发剂，保护层的厚度为0.3—0.8mm为佳。

4、如权利要求2所述的方法：将模具进行清洗，封孔、涂蜡处理，根据本实施例模具1.0X1.0米大小，取0.53公斤不饱和聚酯胶衣，并分别加入10g引发剂、16g固化剂调匀，用喷涂或手工涂刷方法分两次均匀地涂在模具上；待其固化后，再用不饱和聚酯大理石树脂按使用要求喷涂或涂刷在胶衣层上面，并平铺上印制有图案的聚酯无纺布，用排泡器排除气泡；然后浇注基体，以重量计算取不饱和聚酯大理石树脂20份、引发剂0.2份、固化剂0.25份、大理石粉填料80份，并混合均匀，在模具中浇注到所需厚度，用振动方法排出浇铸基体中的气泡；固化后脱模，修整毛边，再进行后处理，即可获得花纹逼真的复合材料地面砖。

说明书

一种复合材料及其制造方法

本发明属于化学类人造石，具体地说涉及一种复合材料及其制造方法。

目前装饰材料的花纹图案、是由颜料局部分散于基体中，一是将粉状颜料直接局部分散于基体树脂中，或者将粉状颜料、液体颜料先分散于少量基体树脂中，再局部分散于基体中，这样形成的花纹、图案随机性强，受环境、材料、操作者水平等因素影响大，难以形成逼真的、符合不同群体审美观的花样效果，以致影响到人工合成类装饰材料的推广应用。而天然材料如大理石、花岗岩等纹路虽然高雅，但原材料难以获得且不可再生，加工制作成本惊人，产品价格昂贵，非一般消费者所能享用。

市场上有一种复合材料以树脂为基体材料，以布和纸砖作增强材料，在表面树脂固化层下的增强材料上有色彩、图案等，其存在如下缺点：玻璃纤维布上印、画图案困难；而布、纸砖与有机树脂不能相容，并且树脂极难渗透，以此制作的产品，图案层与增强层很快会泛白、起泡和分层；以玻璃布为主的基体层由人工于糊成型，多层多次叠加、涂胶、工艺复杂、质量受操作者水平制约；纤维布增强型玻璃钢易变形、收缩，难以满足装饰材料平整要求。

本发明的目的就是为了解决上述技术的不足，提供一种花纹图案逼真、多种式样的复合材料，同时还提供制造这种复合材料的方法。

一种复合材料，基体由树脂、填料、引发剂和固化剂浇铸而成，其特征在于采用印刷有图案的无纺布预埋在基体的表面。

为了使无纺布预埋在基体的表面，本发明提供如下方法：先在模具上喷涂或涂刷保护层，保护层凝胶后，铺上印有图案花纹的无纺布，排出气泡，再用与无纺布分子结构相似的树脂作基体聚合物，以重量计算，取树脂 5—40 份、填料 60—95 份、引发剂 0.05—5 份、固化剂 0.05—8 份，并搅匀后浇铸，振动或真空排泡，固化后脱模，修整毛边，抛光处理即成。

由于将所需图案事先印在无纺布上，并预埋在基体的表面，因此制作的产品，图案纹路逼真、形状式样繁多。也由于制造方法中用与无纺布分子结构相似的树脂作基体聚合物，使基体能够与无纺布相容为一体，且最终反应固化，从而形成逼真的装饰材料产品的图案效果。

下面详细说明。

将装饰材料产品的模具按要求进行表面处理，该模具可以是金属模、木模、平

板玻璃、玻璃钢模、石膏模。在模具表面涂以无色的产品保护层，以起到增加产品的光泽，硬度的功效。该保护层可以用聚丙烯酸酯类树脂、聚酯树脂，聚酰胺、聚酰亚胺类树脂，树脂涂刷前以重量计算，按 1:0.01--0.15 比例分别加入固化剂、引发剂，保护层的厚度为 0.3-0.8mm 为佳。待其完全固化后，再涂刷一层与浇铸聚合物一样的未加填料的树脂，然后将印有花纹图案的无纺布均匀地铺在上面，排出气泡。再浇铸基体，以重量计算取树脂 5--40 份、填料 60--95 份、引发剂 0.05--5 份、固化剂 0.05--8 份，并配制好，浇铸至装饰材料所需厚度，填料可以是大理石粉、玛瑙粉、花岗岩粉、空心微珠等。该基体浇铸高分子聚合物的选择应基于印刷品基材的材质，其分子链节的结构应当与印刷品基材的结构相似或相同，以符合“相似相溶”原理，最终使基体浇铸高分子聚合物在固化的同时，能够与印刷品基材相溶为一体，且最终反应固化，而不影响印刷图案、花纹等，从而形成逼真的装饰材料产品图案效果。当基体浇铸聚合物完全固化后，即可将产品从模具中脱出，修整毛边，必要时进行表面处理。这样就能生产出各种花纹图案的装饰材料。

实施例

在 1.0 X 1.0 米的玻璃钢模具上制作挪威红纹路的仿大理石地砖，用聚酯无纺布印刷挪威红图案，将印制的图案按模具尺寸剪裁备用。

将模具进行清洗，封孔、涂蜡处理，根据本实施例模具大小，取 0.53 公斤不饱和聚酯胶衣，并分别加入 10 g 引发剂、16 g 固化剂调匀，用喷涂或手工涂刷方法分两次均匀地涂在模具上；待其固化后，再用不饱和聚酯大理石树脂按使用要求喷涂或涂刷在胶衣层上面，并平铺上印制有图案的聚酯无纺布，用排泡器排除气泡；然后浇注基体，以重量计算取不饱和聚酯大理石树脂 20 份、引发剂 0.2 份、固化剂 0.25 份、大理石粉填料 80 份，并混合均匀，在模具中浇注到所需厚度，用振动方法排出浇铸基体中的气泡；固化后脱模，修整毛边，再进行后处理，即可获得花纹逼真的复合材料地面砖。

该复合材料可以广泛用于制作家俱、洁具及建筑材料，具有很高的推广价值。